



The Knowledge Explorer Series

GraphMaster





The Knowledge Explorer Series™

GraphMaster™

User's Guide

GraphMaster™

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Quick Reference Page

What Computer Keys Will I Use In GraphMaster?

GraphMaster does not require that you memorize any commands. Instructions will always appear on the screen. All the different keys you will use are listed below. If you don't already know where they are on the keyboard, try locating them before you start.

- Use the keys like a typewriter when you create graphs in GraphMaster.
- When you type numbers, use the numbers in the top row of the keyboard. (*Do not use the letter "L" for one; do not use the letter "O" for zero.*)
- Type numbers *without commas*.
- Use <— to erase. (On the //e and //c, you can use the DELETE key also.)
- Press SPACE BAR to go on to the next screen.
- Press RETURN to enter a response.
- Press ESC to go back one screen or to a previous menu.
- Type Y for "yes;" type N for "no."
- Control U accesses the UTILITY which takes you to the PRINT Menu.
- If you type anything other than the commands the computer is programmed to accept, nothing will happen.

About GraphMaster

GraphMaster is a computer graphing tool that will teach you how to read, understand, and make graphs of your own. You can make and print three different kinds of graphs: *pictographs, bar graphs, and pie charts*.

What Can I Learn with GraphMaster?

- You'll learn how to represent information using graphs and charts.
- You'll get practice using graphing skills in an interesting way.
- You'll learn how to make charts and graphs the easy way—using a computer.
- You'll get computer experience. Making charts and graphs is an important use of computers.

Can GraphMaster Help with School Work?

Because GraphMaster teaches you how graphs and charts are made, it will be easier for you to understand graphs when you run across them in books and articles that you are studying. And when you want to make up graphs of your own, the GraphMaster tool will put the computer to work for you, to make the job easier. Printed graphs can make an impressive addition to term papers and other school assignments.

What Is The GraphMaster Program? What Activities Are on This Disk?

GraphMaster contains four parts:

- 1** In the first part, "Introduction," GraphMaster introduces you to what graphing is and shows how information looks when it is put into each of the three different kinds of graphs.
- 2** The second part, "Learn to Use GraphMaster," teaches you how to make and read graphs, and to understand the purpose of the three kinds of graphs in this program.
- 3** The third part of GraphMaster, "Practice Using GraphMaster," gives you a chance to practice making each of the kinds of graphs. Information you need for this section can easily be found in *The New Book of Knowledge Encyclopedia* (called NBK for short).
- 4** The final level of GraphMaster, "Create Your Own Graphs," gives you a simple-to-use graphing tool for creating and printing graphs of your own from any information you collect—from the NBK or any other source.

How Do I Get Started?

This program is so simple that you don't need to read this guide to get started in GraphMaster. As soon as you "boot up" the disk (load the program from the disk into the computer) you can choose which one of the four parts of GraphMaster to use:

Would you like to

1. See the Introduction
2. Learn to use GRAPHMASTER
3. Practice using GRAPHMASTER
4. Create your own graphs
5. Quit

Press 1, 2, 3, 4, or 5

If you already know all about graphing, you might try creating your own graphs immediately. But to learn about what graphs are and to get to know just how GraphMaster works, we suggest beginning with the Introduction or Part I.

Here's how to "boot up" any of the disks that are used in the *Knowledge Explorer Series™*, (or, for that matter, any disk on any Apple Computer).

To insert the disk:

- 1 Before turning the computer on, remove the disk from its protective sleeve, holding it by the end with the label. *Do not touch the exposed plastic parts of the disk.*
- 2 Hold the disk with the label side up; insert it gently into the disk drive and close the door.
- 3 Turn on the computer. Soon the disk drive's red light will go on and you will hear a whirring sound as the program begins loading into the computer. When the light goes off, the program will begin on the screen.

Treat disks with care!

They can be damaged if:

- something spills on them.
- they are bent.
- you soil the exposed plastic areas.
- they are exposed to extreme heat, cold, humidity, or a powerful magnet.

What Materials Do I Need to Get Started?

All you need to begin is the GraphMaster program disk and Apple //e or //c or an Apple II or II+ with 64K of RAM along with one disk drive and a monitor. If you have the appropriate printer (see the section, "Can I Print My Graphs?") you can make permanent copies of the graphs you make with GraphMaster.

What Books Will I Need to Use with GraphMaster?

The New Book of Knowledge Encyclopedia contains many different kinds of information that might be the beginning for graph ideas. When you get involved with a particular idea, you may want to use other books and materials in the library.

Sometimes you may collect information outside of books and use it to make graphs—for example, "How Many Pets My Friends Have," or "Games Won by Teams in Our League." You may want to use graphs in your homework assignments, using information from textbooks.

How Much Help Will I Need with GraphMaster?

The *Learn to Use GraphMaster* section of the software enables you to use the program without any additional help. Sometimes you may want to ask your librarian or teacher for suggestions of books and materials to help you find information for your own graphs.

If you haven't used the printer before, you may want to ask for help when you print a graph.

How Will GraphMaster Teach Me to Do All This?

As you work through “Practice with GraphMaster,” the program teaches you how to represent numerical information in the three different types of graphs, and how each will look. As you become more familiar with GraphMaster, you will be able to choose in advance the form that shows your data in the best way. This practice level gives you the experience of looking up information in the NBK about one of these topics:

Would you like to use GRAPHMASTER to compare

1. The population of several states or provinces
2. The areas of the Great Lakes
3. The diameter of several planets in the solar system

Type 1, 2, or 3

The program leads you through the steps to take the information from the NBK and then turn it into a pictograph, then a bar graph and a pie chart.

When you feel you are ready to make graphs on your own, select #4, "Create Your Own Graphs," from the main menu.

How Do I Make a Graph Using GraphMaster?

You can make three kinds of graphs.
Choose the kind that you would like to make.

- 1. PICTOGRAPH
- 2. BAR GRAPH
- 3. PIE CHART

At any time, ESC will return to this menu.
Press 1, 2, or 3. Press 4 for Main menu.

After selecting the type of graph you want to make, you can start to answer the questions on the screen to design your own *Graph*. Suppose you choose #1, *Pictograph*.

Using a pictograph, I want to
compare the _____
of several _____

Fill in the blanks. Press ? for examples.
Use ← to erase. Press RETURN when done.

When you fill in the blanks, it is helpful to think about
what kind of information you will type in for each one.

The first, “compare” asks you for a value, something
that can be measured in numbers.

The second, “of several,” asks you for the subject,
the persons or things that *have* that value.

For example, “Using a pictograph, I want to
compare the *Populations* of several *Cities*. The second
blank, “cities,” is the subject label—it is cities that
have populations.

Other comparisons you might make with a pictograph:

- compare the heights of several people,
- the costs of several fruits,
- the weights of several metals, or
- the members of several teams.

The program will then ask you to list your subjects and assign numbers to each.

How Much Can I Put Into a Graph?

The amount of information you can put into a graph is limited by what can be displayed on the screen.

If you are making a *Pictograph* or *Bar Graph*, you can have up to 6 subjects. You can have up to 8 subjects in a *Pie Chart*.

The number values for each subject can have 10 digits. Commas should not be used in numbers. For example, type 10500000 instead of 10,500,000.

Subjects can have names up to 8 characters long, so you may sometimes choose to use abbreviations.

Finally, you give your graph a title. It can be up to 30 characters long, including letters, numbers, symbols, spaces and punctuation marks.

For *Pictographs* you also choose the symbol you want from among 20 different symbols.

Pictograph symbols:



Each symbol will stand for a certain number of people, miles, pounds, dollars, or whatever other units are being counted. For instance, one person symbol might represent 12 people in a *Pictograph* about population. And half of a symbol for a person would stand for 6 people in this same *Pictograph*. The computer tells you at the bottom of the screen what number each symbol represents. (The computer selects the number for each symbol to be sure that each *Pictograph* will fit in the width of the screen.) Then GraphMaster will show you your *Pictograph*.

How Can I Change or Correct My Graph?

When you have completed a graph, GraphMaster will show it to you and then it asks whether you want to make any changes. The program offers you a chance to change each part of your graph until you have it exactly as you want it. (Note: *Printing is the only way you can save a graph*. Print it as soon as you finish each graph, because as soon as you go on to create a new graph, the old data will no longer be in the program.)

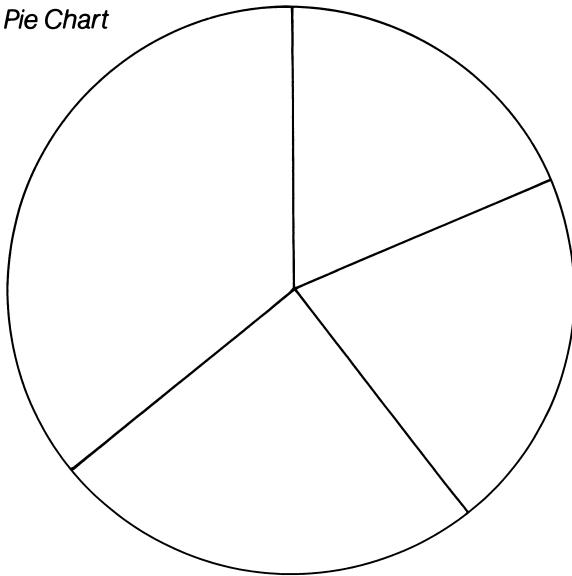
Now GraphMaster will ask you if you would like to print your *Graph*. If you made it just for practice, or do not have a printer, answer N.

Whether or not you print, you will be asked if you want to see the same information in a *Bar Graph*. "Y" (Yes) will give you the *Bar Graph*; "N" (No) will clear the screen to go on to make another graph.

(For printing, see the section, "How Do I Print My Graphs?")

To make a *Bar Graph* or *Pie Chart*, the procedure is the same. Select #2 or #3 from the menu, and follow the instructions that appear on the screen. The blanks that you fill in ask for the same kind of information as for a *Pictograph*. When GraphMaster shows you your *Bar Graph*, it tells you at the bottom of the screen what the "scale" is. That tells what each segment represents.

Pie Chart



Pie Charts are used to show how a whole (like a pie) is divided (as among eaters). When you select #3 from the menu you will see this screen:

In this pie chart, I will show
how _____
is divided among several _____.

I will compare the

of these

Fill in the blanks. Use ? for examples.
Use ← to erase. Press RETURN when done.

It asks you to think of the “whole” you are dividing up. For instance, you might fill in the blanks like this:

In this pie chart, I will show
how MY ALLOWANCE
is divided among several
EXPENSES
I will compare the
AMOUNTS
of these
EXPENSES.

Fill in the blanks. Use ? for examples.
Use ← to erase. Press RETURN when done.

Other comparisons you might make with a *Pie Chart* include:

- Show how *the country* is divided among several regions. Compare the *sizes* of these *regions*.
- Show how *my school* is divided among *grades*. Compare the *number of students* of these *grades*.
- Show how a *farm* is divided among several *crops*. Compare the *number of acres* of those *crops*.

When you have followed the instructions for listing your subjects and the quantities for each—just as for *Pictographs* and *Bar Graphs*, GraphMaster will

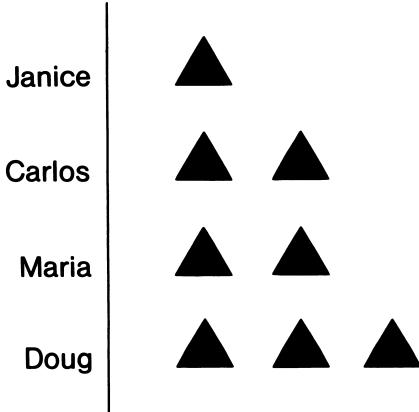
display your *Pie Chart*. At the bottom of the *Pie Chart* it will tell you what the whole equals—that is, the total of all of the numbered segments.

Can I Change a Pictograph to a Bar Graph or Pie Chart?

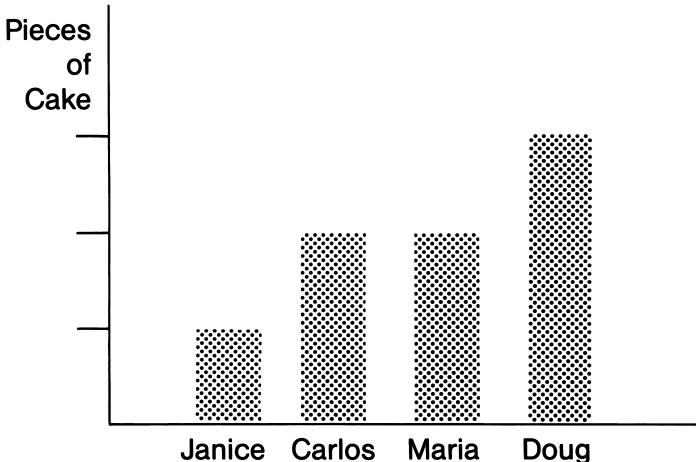
Yes. You can change a *Pictograph* to a *Bar Graph* or a *Bar Graph* to a *Pictograph*. Before you print a *Pictograph*, for instance, GraphMaster will ask if you would like to see the same information displayed as a *Bar Graph*. When you look at your information in a new format, you can choose to:

- change it back,
- leave it in the new graph form, and edit it, and then
- print it or choose to clear the screen.

**WHO ATE THE BIRTHDAY CAKE
PICTOGRAPH**



WHO ATE THE BIRTHDAY CAKE BAR GRAPH



For two reasons, *Pie Charts* cannot be automatically changed to *Bar Graphs* or *Pictographs*. First, *Pie Charts* require dividing parts of a whole, and not all *Bar Graphs* or *Pictographs* fit this requirement. Second, since GraphMaster accommodates up to 8 subjects in *Pie Charts* but only up to 6 in *Pictographs* and *Bar Graphs*, automatic changes will not work. However, you can start a *Pie Chart* from scratch using the same information from your *Bar Graph* or *Pictograph*. (See "User Tips" for more information about doing this.)

How Do I Print My Graphs?

Graphs can be saved in printed form, as long as you have a program-linked printer attached to your computer. When the screen asks you whether you want to print your graph, type "Y." The librarian or teacher will need to have prepared the program to link the printer. This is done by choosing the print utility program (CONTROL U) from the main menu. This menu (listing the printers that can be used) will appear on the screen:

Which printer do you have?

1. Epson MX/80 with GRAFTRAX Plus
2. C. ITOH 8510A "ProWriter"
(or Apple Dot Matrix)
3. A printer using Orange Micro
Grappler+ card.
4. None of these

Press 1, 2, or 3

Once this selection has been made, you can print graphs yourself, just by typing "Y" for yes when the program asks if you want to print a graph you have created.

It is not necessary to go through the utility again, unless a different printer is attached to your computer. If a different printer has been attached, ask your librarian or teacher to run the print utility (Control U) program again, to re-program GraphMaster for that printer.

Printing is the only way you can save a graph. Print as soon as you finish each graph, because as soon as you go on to create a new graph, the old data will no longer be in the program.

User Tips

Once you have worked with GraphMaster for a while, you will get a sense of which graphing methods work best for different tasks. In most cases you will find you achieve exactly the results you wanted. However, there may be some instances when you create a *Pie Chart* only to discover that a *Bar Graph* or, *Pictograph* would have been a better choice.

For example, if you are comparing large numbers (like 21000) to small numbers (like 21) we recommend that you use a *Bar Graph* or *Pictograph*. If you use a *Pie Chart* for this task, you may run into some trouble because the difference in size is so great. The small numbers may disappear and their names get jumbled.

When working with percentages, *Pie Charts* are an excellent choice.

When working with *Bar Graphs* and *Pictographs*, always check the key in the lower right-hand corner. Otherwise you may not realize what number is being represented by one segment of the bar or one symbol of the *Pictograph*.

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Instructor's Guide

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Instructor's Guide written by
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Message to Librarians and Teachers

Welcome to *The Knowledge Explorer Series*.™ This series was developed in response to your needs. Our research among your peers concluded that many computers in schools were located in libraries/media centers, yet there was no software available that taught, reinforced and gave students an opportunity to practice and master basic research skills.

This group of five programs was designed to take advantage of the unique opportunities the computer and *The New Book of Knowledge Encyclopedia* provide for stimulating discovery learning. Your students will find the *Knowledge Explorer Series* both challenging and fun. You will find that it helps you to teach valuable research skills in a refreshing new way.

Relax

If you are a new computer user, do not panic. The software is easy to use and requires little or no previous knowledge about computers. If you are an experienced user, you will feel right at home!

Program Components

This package is designed for librarians, teachers, and their students. Each program can be used individually or in conjunction with others in *The Knowledge Explorer Series* for individual students, small groups or large group experiences.

1 *User's Guide*

This guide, written for students, describes the software. It explains the program's various levels and how to use each one. However, it is not necessary to read the guide before proceeding with the software. The programs are self-explanatory. Instructions and hints are provided. The User's Guides are designed to

provide easy reference to students or instructors with questions. We do recommend that the librarian and/or the instructor review the guides before assigning the programs to students.

2 Program Diskette

3 The New Book of Knowledge Encyclopedia

This encyclopedia is an integral part of *The Knowledge Explorer Series*. It is a required reference for some of the programs and all of the tutorials in the series. Also, many ancillary activities suggested in this guide require it as a resource.

4 Instructor's Guide

This guide is flexible and designed to help librarians and/or teachers facilitate learning in their libraries, classrooms or media centers by combining the new technology with more traditional methodology. It contains learning objectives for the software and accompanying suggested lesson plans and activities.

Learning Objectives

Cognitive

- Students practice illustrating numerical information in visual terms such as pictographs, bar graphs and pie charts.
- Students learn which type of graph is most appropriate to illustrate a specific comparison.
- Students practice reading graphs and charts.
- Students use *The New Book of Knowledge* and the software to see the application of researching information to compare data and to create graphs and charts based on this information.
- Students gain computer awareness through exposure to one of the computer's important uses: the creation of charts and graphs.
- Students practice making numerical comparisons.
- Students practice fractions and percents.

Affective

- Students interact with peers and/or their librarian or teacher while using the computer software and ancillary materials.
- Students use the software with a minimum of adult intervention.
- Students have fun while using the computer and the associated learning materials.

Software Description

In GraphMaster, students read, use and create their own graphs. The program is designed for students who have little or no experience with graphs. Therefore, the software is appropriate for younger students as well as those in upper elementary grades. The last level on this disk is a helpful tool for students and adults.

GraphMaster teaches students about three different types of graphs: pictographs, bar graphs and pie charts. The purpose of each graph is explained carefully and students can practice making each type. Also, students read and gather information from *The New Book of Knowledge*. This process, of using the encyclopedia in conjunction with the computer software, reinforces the use of two important learning tools. In addition, students are exposed to a practical and important function of computers; by using the computer to make graphs and charts, the user has a powerful tool at his/her disposal.

The four levels in GraphMaster are:

1 *Introduction*

The first part of the program is a simple tutorial which introduces students to graphing concepts. It explains how to use the program as well as how information can be represented in a visual format. The three types of graphs illustrated are: pictographs, bar graphs and pie charts.

2 *Learn to Use GraphMaster*

The second part of the program shows students how to make graphs. It also gives students practice in reading and understanding the purpose of the three types of graphs in the software.

3 Practice Using *GraphMaster*

The third part of the program is a prompted practice session through which students make each of the three types of graphs. Students use *The New Book of Knowledge Encyclopedia* along with the program to create several graphs. This level illustrates the usefulness and application of graphs as well as the process of researching for comparative data. If your computer has a compatible printer attached (see User's Guide), students can print out any graphs they create as part of this level.

4 Create Your Own Graphs

The fourth part of the program is a graphing tool that allows students to create graphs on their own and make numerical comparisons by using data they have collected themselves. Suggestions for data collection activities follow in this guide. Students can print out any graphs they create as part of this level if the computer has an attached printer.

Printing Graphs

Graphs can be saved in printed form, as long as you have a program-linked printer attached to your computer. The librarian or teacher will need to have prepared the program to link the printer. This is done by choosing the print utility program (CONTROL U) from the main menu.

Getting Started

This software runs on the Apple //e or //c and on the Apple II or II + with 64K of RAM memory.

How to begin:

- 1** Open the disk drive door.
- 2** Insert the disk with its label facing upward.
- 3** Close the disk drive door.
- 4** Turn on your Apple and your television or monitor.
The program's title screen appears first.

To turn on your Apple, press the switch on the back, left side of the computer.

Lesson Plans and Library and Classroom Activities

The following are suggestions for research activities, class discussions, learning games and practice activities. Symbols precede each activity. Most activities can be adapted for either a library or classroom situation. Here is a key for those symbols.



Classroom activity



Library activity



Computer required



The New Book of Knowledge required



Game

GraphMaster is integrated easily into existing classroom and library media center curricula. Because this program is intended for students who have little or no experience with reading and creating graphs, the librarian or teacher can prepare lessons which allow students to interact with the computer in conjunction with print materials traditionally used to introduce graphing skills.

GraphMaster fits into any curriculum area. Students use graphs and charts to make numerical comparisons in Science, Social Studies, Mathematics and Language Arts activities.

GraphMaster Lesson Plan

Below are several examples and suggestions for creating graphs. Choose one of those examples and use this sample lesson plan to guide your students through *GraphMaster*'s sections to maximize their experience.

Session One. Introduce the types of graphs presented on the disk. Discuss how comparative information can be displayed in several visual formats.

Session Two. Students work individually, in pairs or in small groups with or without their librarian or teacher and complete sections one and two on the program disk. Create graphs on the chalkboard as part of a class discussion to provide students with a concrete experience. At this point, students are comfortable with reading graphs and with the components of graphs.

Session Three. Now students are ready to use the practice level (section three on the program diskette) which combines software and *The New Book of Knowledge*. Encourage students to add or delete information from their graphs to illustrate the power of the computer. Print several graphs and create a bulletin-board display.

Session Four. Finally, students are ready to create their own graphs. Encourage students to use more than one format to graph their information.



Time Goes By

Learning Objective: Students observe how time is spent and translate that information into a graph.

Activity: Discuss with your students how they spend their time in school. What portion of each day is devoted to Mathematics, Science, Reading, Spelling, Social Studies, Lunch, Gym, etc.? Make pie charts to illustrate the time periods. Now, talk about how the students spend their time over a weekend. Make pie charts to illustrate the results. Many students watch too much television. Make that time a data gathering session. Direct students to record how much television time is devoted to cartoons, soaps, sports, comedies, adventures, doctor stories, movies, etc. Graph and analyze the results. Discuss how two graphs of the same size can represent different lengths of time.

CL

L

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Everyday Graphs

Learning Objective: Students practice making numerical comparisons using a visual format.

Activity: There are many common every day occurrences which can become subjects for graphs. Collect the information from your students, record it on the paper, and have students graph the findings using *GraphMaster*. Here are suggestions for graphs to make with your class:

- 1 How many birthdays of students in your class are in each month of the year?
- 2 How many boys and girls are there in your class?
- 3 What kinds of pets do your students have?
- 4 What are your students favorite colors, television shows, ice cream flavors, etc. (each one is a separate graph).
- 5 Record the temperature, humidity, wind direction, or precipitation daily.
- 6 Record the high temperature and low temperature each day for a month.
- 7 What careers do your students want to pursue?

Print Out All Graphs.

Each student can make the same type of graph. Or, divide the class into three groups; one group makes a bar graph, a second group makes a pie chart and the third group makes a pictograph, as appropriate, for the same information. Work with another librarian or teacher. Two classes can use the same questions to collect data and make graphs. Then, have students compare the results between the two classes. Each class can write questions about their graphs for the other class to answer.



Famous People's Lives

Learning Objective: Students research the lives of several famous people and graph their findings.

Activity: Students choose several famous people from your current Social Studies unit, if possible. Or, they choose several famous people who lived in different eras. Direct students to research the lives of these people in *The New Book of Knowledge Encyclopedia* and to record their birthdates and the dates of their death. When the data collection process is complete, students graph the number of years each person lived. Compare results and note if people live longer now or in the past. Also, students can write biographies about famous people. Review the qualities of a biography with your students. Point out the biography section in the library/media center. (Students also can compare the lifespans of various animals.)



Graph Readings

Learning Objective: Students read bar graphs, pie charts and pictographs.

Activity: Prepare several graphs using GraphMaster. Write questions about each graph on an index card. Direct students to choose a card, and answer the questions about a chosen graph. Use any volume of *The New Book of Knowledge Encyclopedia* or files you create with InforMaster as a source for data.

As an alternate activity, students take a graph made by the teacher and write five questions to accompany it. Then, students exchange cards and answer each others' questions.



Who Likes What?

Learning Objective: Students gain concrete experience representing the same information in three different graphic forms: pictograph, bar graph and pie chart.

Activity: First, have students complete a school wide survey to determine what the favorite school activity is in their class and in other classes. A sample survey form can look like this:

NAME: _____

GRADE: _____

CLASS: _____

FAVORITE SCHOOL ACTIVITY: _____

Once the information is gathered, it can be graphed in all 3 ways. Discuss how each of these graphs is related to the others, and how each tells a slightly different story about the information. Have students suggest other information that can be included in a survey and represented graphically. Also, the survey information can be placed into *InforMaster* as a database. The database can be enlarged at any time. You can try using *InforMaster* to sort the survey information in different ways, such as by class, grade, or class and grade for each activity.

Alternate Activities: Direct students to choose any country in the world (make sure there are no duplications). Students use *The New Book of Knowledge* to locate vital statistics about their country: its size in square miles, its population, its gross national product, etc. Then, students do the same research about the United States. Finally, students use GraphMaster to create graphs which compare the statistics between the United States and their country. Students can write an explanation for the similarities and differences between the two countries.

Direct students to use GraphMaster to make scientific comparisons based on your curriculum: number of moons for each planet, life span of certain animals, hardness of rocks and minerals, etc.



Graph the Word

Learning Objective: Students translate word problems to graphs.

Activity: Write word problems on task cards. Direct students to choose a card and make a graph of the card's contents. Make a bulletin-board display of the graphs. Here are sample word problems:

- 1** Mr. Johnson's class had a picnic at the end of the school year. Here is what the students ate for lunch: 6 ate hotdogs, 10 ate hamburgers, 4 ate peanut butter and jelly sandwiches, 2 ate yogurt, and 8 ate tuna fish sandwiches. What was the most popular food at the picnic?
- 2** At the same picnic, Mr. Johnson held a track & field meet. The class was divided into three teams. The Red Team won the three-legged race, the softball throw for distance and the standing broad jump. The Blue Team won the crab race, the fifty yard dash, the running board jump and the basketball free throw. The Purple Team won the four-forty yard run-walk, the sack race, the egg roll, the rope climb and the water balloon catch. Which team won the most events?
- 3** At the end of the picnic, Mr. Johnson asked the students how they planned to go home. Here is how they went home: 14 took the school bus, 5 walked, 3 went in a car, 7 went in a van and 1 took a taxi. What percentage went in a car? (represent in a pie chart)



Draw a Graph

Learning Objective: Students see how the computer is a productivity tool for them.

Activity: Ask students to gather information suitable for graphing. For example, the number of students of six different grades. Now ask them to devise a scale and create their own graphs by hand. Then use the same information to create computer graphs. See how much faster the computer is at calculating scales and drawing graphs!

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